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(54) **APPARATUS FOR GENERATING AIR FLOWS FOR CLEANING, MAINTENANCE AND SIMILAR SERVICES**

(57) An apparatus (1) for generating air flows for cleaning, maintenance and similar services, comprising a suction element (2) which leads to a chamber (3) which contains a bag (4) for the collection of the aspirated material, the mouth of which is connected to a first shunt branch (5) of a channel (6) which is provided with at least one terminal connector for the connection of a work pipe. The apparatus (1) comprises: a second shunt branch (7) of the channel (6), which leads to an assembly (8) for the forced emission of an air flow; at least one controlled valve (9) provided with partitions (10, 11, 12, 13) for the flow control of the first branch (5) and the second branch (7). The valve (9) is configured for the selective opening exclusively of one of the shunt branches (5, 7) at a time on the channel (6).

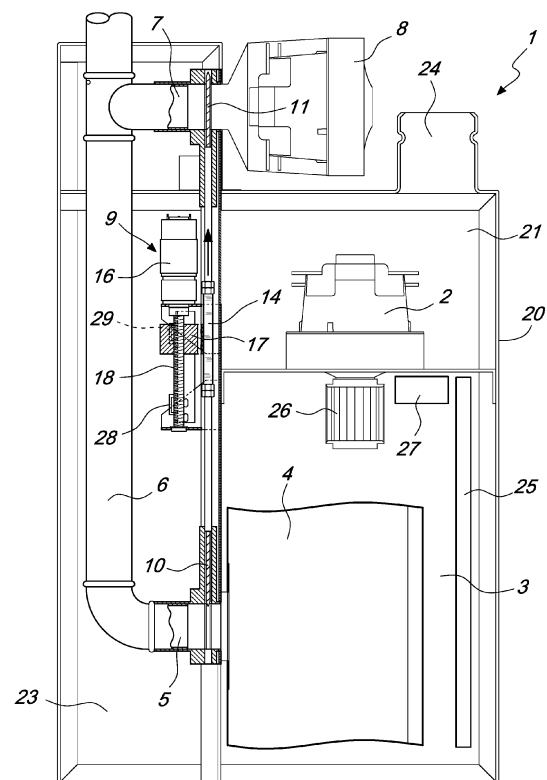


Fig. 1

Description

[0001] The present invention relates to an apparatus for generating air flows for cleaning, maintenance and similar services: in particular, the use is known of ducted suction systems which provide for the use of a single centralized motor assembly (with which a collection bag and a filter are also associated) connected to a network of ducts (formed within the walls or in the floors or in the floor slabs) which lead to connectors installed in respective walls of a space to which tubes to be used for cleaning, maintenance and similar operations can be connected.

[0002] This type of system is particularly efficient, since it can take advantage of a very powerful motor for suction, therefore ensuring an excellent head at each installed connector and for any work pipe (and corresponding accessories) connected thereto.

[0003] By virtue of this type of system, it is possible to perform even very thorough suction operations, but this system is not sufficient for a complete cleaning/maintenance of all spaces and/or furniture and/or machines.

[0004] In fact, accumulations of dust, dirt, debris may occur in regions and/or parts that are not accessible to the work pipe (and respective accessories); in some cases the dust (or, in general, particles of any material) may even impregnate some materials, making it impossible to clean them well simply by suction.

[0005] In such cases, the assigned operators must therefore also resort to other devices to complete the intended cleaning and maintenance operations.

[0006] The aim of the present invention is to solve the problems described above, proposing an apparatus for generating air flows for cleaning, maintenance and similar services that makes it possible to perform all the necessary operations without having to resort to additional tools in order to complete the mentioned services.

[0007] Within the scope of this aim, an object of the invention is to propose an apparatus for generating air flows for cleaning, maintenance and similar services of a versatile type.

[0008] Another object of the invention is to propose an apparatus for generating air flows for cleaning, maintenance and similar services that makes it possible to treat effectively components impregnated with dust or other residues.

[0009] Another object of the invention is to propose an apparatus for generating air flows for cleaning, maintenance and similar services that makes it possible to combine multiple separate treatments in the spaces and/or furniture and/or machines to be subjected to cleaning, maintenance and the like.

[0010] Another object of the invention is to propose an apparatus for generating air flows for cleaning, maintenance and similar services that can be integrated in ducted suction systems of a known type in order to implement their respective operating modes.

[0011] A further object of the present invention is to

provide an apparatus for generating air flows for cleaning, maintenance and similar services that has low costs and is relatively easy to provide in practice and of assured application.

[0012] This aim and these objects and others that will become more apparent hereinafter are achieved by an apparatus for generating air flows for cleaning, maintenance and similar services, of the type comprising a suction element which leads to a chamber which contains a bag for the collection of the aspirated material, the mouth of which is connected to a first shunt branch of a channel which is provided with at least one terminal connector for the connection of a work pipe, characterized in that it comprises:

- a second shunt branch of said channel which leads to an assembly for the forced emission of an air flow,
- at least one controlled valve provided with partitions for the flow control of said first shunt branch and said second shunt branch, said valve being configured for the selective opening exclusively of one of said shunt branches at a time on said channel.

[0013] Further characteristics and advantages of the invention will become more apparent from the description of a preferred but not exclusive embodiment of the apparatus for generating air flows for cleaning, maintenance and similar services, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a schematic view of a possible embodiment of an apparatus for generating air flows for cleaning, maintenance and similar services according to the invention in a first operational arrangement; Figure 2 is a schematic view of the apparatus of Figure 1 in a second operational arrangement; Figure 3 is a schematic front view of the flow control valve of the apparatus of Figure 1; Figure 4 is a schematic side view of the flow control valve of the apparatus of Figure 1; Figure 5 is a schematic perspective view of the valve of Figures 3 and 4; Figure 6 is a schematic view of a further embodiment of an apparatus for generating air flows for cleaning, maintenance and similar services according to the invention.

[0014] With reference to the figures, the apparatus for generating air flows for cleaning, maintenance and similar services is generally designated by the reference numeral 1.

[0015] The apparatus 1 according to the invention comprises a suction element 2 which leads to a chamber 3 which contains a bag 4 for the collection of the aspirated material.

[0016] The mouth of the bag 4 is connected to a first shunt branch 5 of a channel 6 which is provided with at least one terminal connector (which faces a respective

space in which the cleaning and maintenance operations may be performed) for the connection of a work pipe.

[0017] The personnel assigned to the cleaning and/or maintenance operations may therefore use the work pipe (optionally by connecting appropriate accessories thereto) in order to perform their activities in the space in which said connector is present (and on the furniture and/or machines present in said space).

[0018] The apparatus 1 according to the invention comprises a second shunt branch 7 of the channel 6, which leads to an assembly 8 for the forced emission of an air flow.

[0019] The apparatus 1 according to the invention comprises furthermore at least one controlled valve 9 provided with partitions 10, 11, 12 and 13 for flow control of the first shunt branch 5 and of the second shunt branch 7.

[0020] The valve 9 is configured for the selective opening exclusively of one of the shunt branches 5, 7 at a time on the channel 6: in practice, only the suction element 2 or the forced emission assembly 8 may be connected to the channel 6 (it is not excluded, in any case, that a configuration might be provided in which all the partitions 10, 11, 12 and 13 are closed and therefore neither of said two components leads to the channel 6, which is therefore isolated).

[0021] It is specified that the assembly 8 for the forced emission of an air flow can advantageously comprise a respective actuation motor, which is associated with air conveyance means of the type of blades, fans, turbines, gears, screws, and the like.

[0022] In practice, the forced emission assembly 8 behaves like a component of the type of a fan, a compressor, a blower or the like.

[0023] It is specified that, with particular reference to a constructive solution of unquestionable interest in practice and in application, the apparatus 1 can advantageously comprise means for the detachable coupling of a single actuation motor alternately to the suction element 2 and to the assembly 8 for the forced emission of an air flow for the respective movement. In this manner, a single motor can actuate both the suction operations and the blowing operations (i.e., forced expulsion of air).

[0024] One solution that has a simpler implementation provides that the suction element 2 and the assembly 8 for the forced emission of an air flow can be conveniently provided with a respective actuation motor.

[0025] In order to identify a particularly efficient embodiment of the present invention, it is specified that the at least one controlled valve 9 may comprise at least one first partition 10, 12 for flow control of the first shunt branch 5 and at least one second partition 11, 13 for flow control of the second branch 7.

[0026] Such partitions 10, 12 and 11, 13 are conveniently mutually interlocked in phase opposition, i.e., they can move between a first limiting configuration, in which the first partition 10, 12 hermetically occludes the first shunt branch 5 and the second partition 11, 13 is external

to the second branch 7 (therefore allowing air to flow freely through it), and a second limiting configuration, in which the second partition 11, 13 hermetically occludes the second shunt branch 7 and the first partition 10, 12 is external to the first branch 5 (therefore allowing air to flow freely through it).

[0027] With particular reference to the constructive solution just described, it is specified that the partitions 10, 12 and 11, 13 may advantageously be interconnected by means of a rigid rod 14, 15 (although it is not excluded that they might be provided monolithically, i.e., with a single movable block, the ends of which constitute the partitions 10, 12 and 11, 13), which is suitable to form the interlock of the mechanical type between the partitions 10, 12 and 11, 13; the rigid rod 14, 15 may be associated with the movable element of an actuator of a type preferably chosen from a device constituted by a motor 16 and a movable slider 17 actuated by a worm screw 18 associated with the motor 16 (keyed to the respective shaft), a hydraulic cylinder, a pneumatic cylinder, a linear induction motor, a device constituted by a motor and a pinion associated with the motor and engaged on a rack, a controlled electric motor, an electric step motor 19 (to the shaft of which it is possible to connect the partitions 12 and 13, of a rotating type and angularly offset so as to ensure that when a first partition 12 occludes the respective branch 5, the other partition 13 allows the free passage of air through the branch 7).

[0028] With particular reference to a further constructive solution (not shown in the accompanying figures), the first partition 10, 12 can be connected to a respective first actuator and the second partition 11, 13 can be connected to a respective second actuator.

[0029] In this constructive configuration, at least one control and management unit is adopted and is configured for the simultaneous and synchronous actuation of the first and second actuators in respective phase opposition.

[0030] The control and management unit constitutes an interlock between the partitions 10, 12 and 11, 13 of the logic type.

[0031] This embodiment also provides for the possibility to arrange, on command of the control and management unit, all the partitions 10, 11, 12 and 13 in occlusion of the respective branch 5, 7, isolating the channel 6 completely with respect to the apparatus 1.

[0032] In an embodiment of unquestionable practical interest, the apparatus 1 according to the invention can comprise a box-like body 20 provided with separate compartments designed to accommodate at least one of the respective components.

[0033] In particular, the box-like body 20 comprises at least one first compartment 3 (which in practice coincides with said chamber 3), provided with the first shunt branch 5, which contains the bag 4 for collecting the aspirated material (the mouth of which is connected to the first branch 5).

[0034] The box-like body 20, in this case, may validly

comprise also at least one second compartment 21 which contains the suction element 2, which has a suction sleeve 22 of its own which is open onto the first compartment 3, and at least one third compartment 23 for the accommodation of the channel 6 to which the branches 5, 7 lead.

[0035] The second compartment 21 may advantageously have a channel 24 for expelling the air (the suction element 2 will generate an air flow that will have to be expelled outward in order to ensure effectiveness of the suction).

[0036] The forced emission assembly 8, provided with a respective motor, may advantageously have an arrangement chosen from inside a fourth compartment (not identified specifically in the accompanying figures, since it can be arranged intuitively in the box-like body 20) and outside the box-like body 20.

[0037] It is specified that the apparatus 1 might favorably comprise at least one component chosen from a lamp 25 which emits ultraviolet radiation, a filter 26 and an ozonization unit 27 (the ozonization unit is an apparatus that produces ozone, an unstable gas that is already naturally present in the upper layers of the atmosphere; this molecule is capable of inactivating viruses and destroying many organic and inorganic contaminants present in both the water and the air we breathe, as well as of neutralizing bad odors that are present in spaces) in at least one region chosen from the first compartment 3 (chamber 3), the cavity inside the channel 6, the cavity inside the first branch 5, the cavity inside the second branch 7.

[0038] In particular, the arrangement shown by way of non-limiting example in the accompanying figures provides that the filter 26 (for example of the G4 class, according to the provisions of the EN779 - ISO 16890 standard) is coupled to the suction sleeve 22 of the suction element 2 so as to block selectively particles of predefined thickness on the surfaces of the filter 25, avoiding their expulsion into the outside environment through the channel 24.

[0039] The lamp 25 which emits ultraviolet radiation (for example, a strip of LEDs with ultraviolet emission) and/or the ozonization unit 27 may also be installed inside the compartment 3 (chamber 3).

[0040] In this manner, everything that is inside the compartment 3 (chamber 3), and therefore also the bag 4 containing the aspirated material, will be subjected to a bactericidal action by the UV lamp 25 and/or the ozonization unit 27, giving assurance to the operator who will have to replace the bag 4 that he will access the compartment 3 only in a decontaminated condition thereof (so as not to be exposed to potentially dangerous viruses, bacteria or fungi).

[0041] Likewise, it may be useful to install respective UV lamps 25, filters 26 and ozonization units 27 inside the channel 6 or inside the branches 5 and 7 in order to subject the flow of air to a continuous bactericidal and sanitizing action.

[0042] In particular, by arranging at least one component chosen from the UV lamps 25, the filters 26 and the ozonization units 27 in the second branch 7, it is possible to generate a flow of air in output from the connector that is present in the wall (that is, the air flow emitted for use of the apparatus 1 as a blower), which may be conveniently sanitized by means of said components.

[0043] The possibility is not excluded to use the ozonization unit 27 installed in the branch 7 for operations of environmental sanitization: when the space in which the connector associated with the channel 6 is located is not occupied by people, it is possible to start a delivery of a flow of air via the forced emission assembly 8; the air flow meets the ozonization unit 27 along the branch 7 and therefore an emission of an air flow rich in ozone occurs that spreads in the spaces, sanitizing them (it is only necessary to select an emission time consistent with the volume of the space to be treated).

[0044] Secondly, the delivery of air enriched with ozone allows sanitization of the entire channel 6, preventing bacteria, viruses or fungi from proliferating inside it.

[0045] It is specified that the UV lamp 25 and the ozonization unit 27 may be functionally associated with a timer that defines their operating cycles.

[0046] The apparatus 1 according to the invention ensures an operation as a suction unit and as a blower without having to duplicate the channels 6 (i.e., maintaining a system that is fully identical to the one provided for ducted suction units of the known type).

[0047] This result is obtained by virtue of the presence of the valve 9 with partitions 10, 12 and 11, 13 which are interlocked, i.e., which makes it possible to permit free flow of air at most through a single branch (chosen from the first branch 5 and the second branch 7 that lead to the channel 6). By virtue of the presence of the valve 9 (however provided), the spread of aspirated dust into the space during blowing operations is avoided, since the collection bag 4 is completely isolated in the compartment 3 (chamber 3) while the assembly 8 for the forced emission of a flow of air determines the blower function of the apparatus 1.

[0048] The blower function is particularly useful, or even essential, in order to perform cleaning and/or maintenance operations with greater effectiveness than the suction function alone. Merely by way of example, it is possible to consider the need for blowing in order to remove dirt before suction, typical of fabrics, padded items and upholstery. Likewise, a similar problem can occur during the ordinary maintenance of electronic instruments (personal computers, keyboards, servers, racks containing telecommunication devices) or industrial machines.

[0049] Trivially, the blower function is also particularly useful for cleaning behind radiators, under cabinets, under furniture where very often suction alone does not guarantee removal of the accumulated dirt.

[0050] It is essential to specify that, before switching

from the suction function to the blower function, a predefined time interval always elapses which is required for the valve 9 to close one branch (for example the first branch 5) and open the other one (for example the second branch 7) and vice versa.

[0051] It is essential that the partitions 10, 11, 12, 13 apply a function of hermetic closure of the respective branch 5 or 7: for this purpose, sealing gaskets are provided against which the partitions 10, 11, 12, 13 abut in order to ensure the tightness of the closure of the respective branch 5 or 7 (ensuring also the optional seal with respect to liquids, as well as with respect to gas flows).

[0052] By way of non-limiting example, it is specified that the partitions 10 and 11 may validly be rendered integral by means of a rod 14 coupled to the movable slider 17 actuated by a worm screw 18 actuated by the motor 16. The fixing of the partitions 10 and 11 to the rod 14 is adjustable in order to determine the correct mutual arrangement thereof. The two partitions 10, 11 behave like guillotines, sectioning off the respective branch 5, 7 and isolating the upstream part thereof with respect to the downstream part of said branch 5, 6. The motor 16 may be powered at 12 volts (although any different electric power supply is not excluded) and the worm screw 18 along which the slider 17 (which comprises within it a female thread of a shape and size complementary to that of the worm screw 18) may move is keyed to its shaft: the rod 14 is integral with the slider 17 and thus any movement of the motor 16 causes the translation of the partitions 10, 11 so that, in an alternative and opposite manner, they provide for the simultaneous opening and closing of one of the two branches 5, 7.

[0053] The positions that correspond to the stroke limits, at which the motor 16 must be stopped, are detected by respective position switches 28 and 29 on which the slider 17 abuts when a corresponding partition 10, 11 has completely occluded a respective branch 5, 7 (while the other one has completely cleared the other branch 7, 5).

[0054] Advantageously, the present invention solves the problems described above, proposing an apparatus 1 for generating air flows for cleaning, maintenance and similar services that makes it possible to perform all the necessary operations without having to resort to additional tools in order to complete the mentioned services.

[0055] Conveniently, the apparatus 1 according to the invention is very versatile.

[0056] Favorably, the apparatus 1 according to the invention makes it possible to treat effectively components impregnated with dust or other residues: in fact, it is possible to release the dust impregnated therein by virtue of the blowing operations. For this reason, the apparatus 1 according to the invention also allows maintenance operations for air filters, which must be subjected to a jet of compressed air in order to eliminate the accumulations of dust on their surfaces.

[0057] Advantageously, the apparatus 1 according to the invention makes it possible to combine multiple sep-

arate treatments in the spaces and/or furniture and/or machines to be subjected to cleaning, maintenance and the like.

[0058] Positively, the apparatus 1 according to the invention can be integrated in ducted suction systems of a known type to implement the respective operating modes: it is in fact sufficient to provide the second branch 7, arrange a valve 9 for flow control of the branches 5 and 7 and insert the assembly 8 for the forced emission of an air flow in order to transform a ducted suction unit of a known type into an apparatus 1 according to the invention.

[0059] Validly, the apparatus 1 for generating flows of air for cleaning, maintenance and similar services according to the invention is relatively easy to provide in practice and low-cost: these characteristics make the apparatus 1 according to the invention an innovation of assured application.

[0060] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the accompanying claims; all the details may furthermore be replaced with other technically equivalent elements.

[0061] In the examples of embodiment shown, individual characteristics, given in relation to specific examples, may actually be interchanged with other different characteristics that exist in other examples of embodiment.

[0062] In practice, the materials used, as well as the dimensions, may be any according to the requirements and the state of the art.

[0063] The disclosures in Italian Patent Application No. 102022000013045, from which this application claims priority, are incorporated herein by reference.

[0064] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. An apparatus for generating air flows for cleaning, maintenance and similar services, of the type comprising a suction element (2) which leads to a chamber (3) which contains a bag (4) for the collection of the aspirated material, the mouth of which is connected to a first shunt branch (5) of a channel (6) which is provided with at least one terminal connector for the connection of a work pipe, **characterized in that** it comprises:

- a second shunt branch (7) of said channel (6) which leads to an assembly (8) for the forced emission of an air flow,
- at least one controlled valve (9) provided with

- partitions (10, 11, 12, 13) for the flow control of said first shunt branch (5) and said second shunt branch (7), said valve (9) being configured for the selective opening exclusively of one of said shunt branches (5, 7) at a time on said channel (6).
2. The apparatus according to claim 1, **characterized in that** said assembly (8) for the forced emission of an air flow comprises a respective actuation motor which is associated with air conveyance means, such as blades, fans, turbines, gears, screws, and the like.
 3. The apparatus according to one or more of the preceding claims, **characterized in that** it comprises means for the detachable coupling of an actuation motor alternately to said suction element (2) and to said assembly (8) for the forced emission of an air flow for the respective movement.
 4. The apparatus according to one or more of the preceding claims, **characterized in that** said at least one controlled valve (9) comprises at least one first partition (10, 12) for flow control of said first shunt branch (5) and at least one second partition (11, 13) for flow control of said second branch (7), said partitions (10, 11 - 12, 13) being mutually interlocked in phase opposition, i.e., between a first limiting configuration, in which said first partition (10, 12) hermetically occludes said first shunt branch (5) and said second partition (11, 13) is external to said second branch (7), and a second limiting configuration, in which said second partition (11, 13) hermetically occludes said second shunt branch (7) and said first partition (10, 12) is external to said first branch (5).
 5. The apparatus according to claim 4, **characterized in that** said partitions (10, 11 - 12, 13) are mutually interconnected by means of a rigid rod (14, 15), which forms said interlock of the mechanical type and is associated with the movable element of an actuator of a type preferably chosen from a device constituted by a motor (16) and a movable slider (17) actuated by a worm screw (18) associated with said motor (16), a hydraulic cylinder, a pneumatic cylinder, a linear induction motor, a device constituted by a motor and a pinion associated with said motor and engaged on a rack, a controlled electric motor, an electric step motor (19), and the like.
 6. The apparatus according to claim 4 and as an alternative to claim 5, **characterized in that** said first partition (10, 12) is connected to a respective first actuator and said second partition (11, 13) is connected to a respective second actuator, at least one control and management unit being configured for the simultaneous and synchronous actuation of said first and second actuators in respective phase opposition, said control and management unit defining said interlock of the logic type.
 7. The apparatus according to one or more of the preceding claims, **characterized in that** it comprises a box-like body (20) provided with separate compartments (3, 21, 23) designed to accommodate at least one of the respective components.
 8. The apparatus according to one or more of the preceding claims, **characterized in that** said box-like body (20) comprises at least one first compartment (3), provided with said first shunt branch (5), which contains said bag (4) for the collection of the aspirated material, the mouth of which is connected to said first branch (5), at least one second compartment (21) which contains said suction element (2) and has a suction sleeve (22) which is open onto said first compartment (3), at least one third compartment (23) for the accommodation of said channel (6) to which said branches (5, 7) lead, said assembly (8) for the forced emission of an air flow having an arrangement chosen from inside a fourth compartment and external to said box-like body (20).
 9. The apparatus according to one or more of the preceding claims, **characterized in that** it comprises at least one component chosen from a lamp (25) which emits ultraviolet radiation, a filter (26) and an ozonization unit (27) in at least one region chosen from said first compartment (3), the cavity inside said channel (6), the cavity inside said first shunt branch (5), the cavity inside said second shunt branch (7).
 10. The apparatus according to one or more of the preceding claims, **characterized in that** said UV lamp (25) and said ozonization unit (27) are functionally associated with a timer which defines their operating cycles.

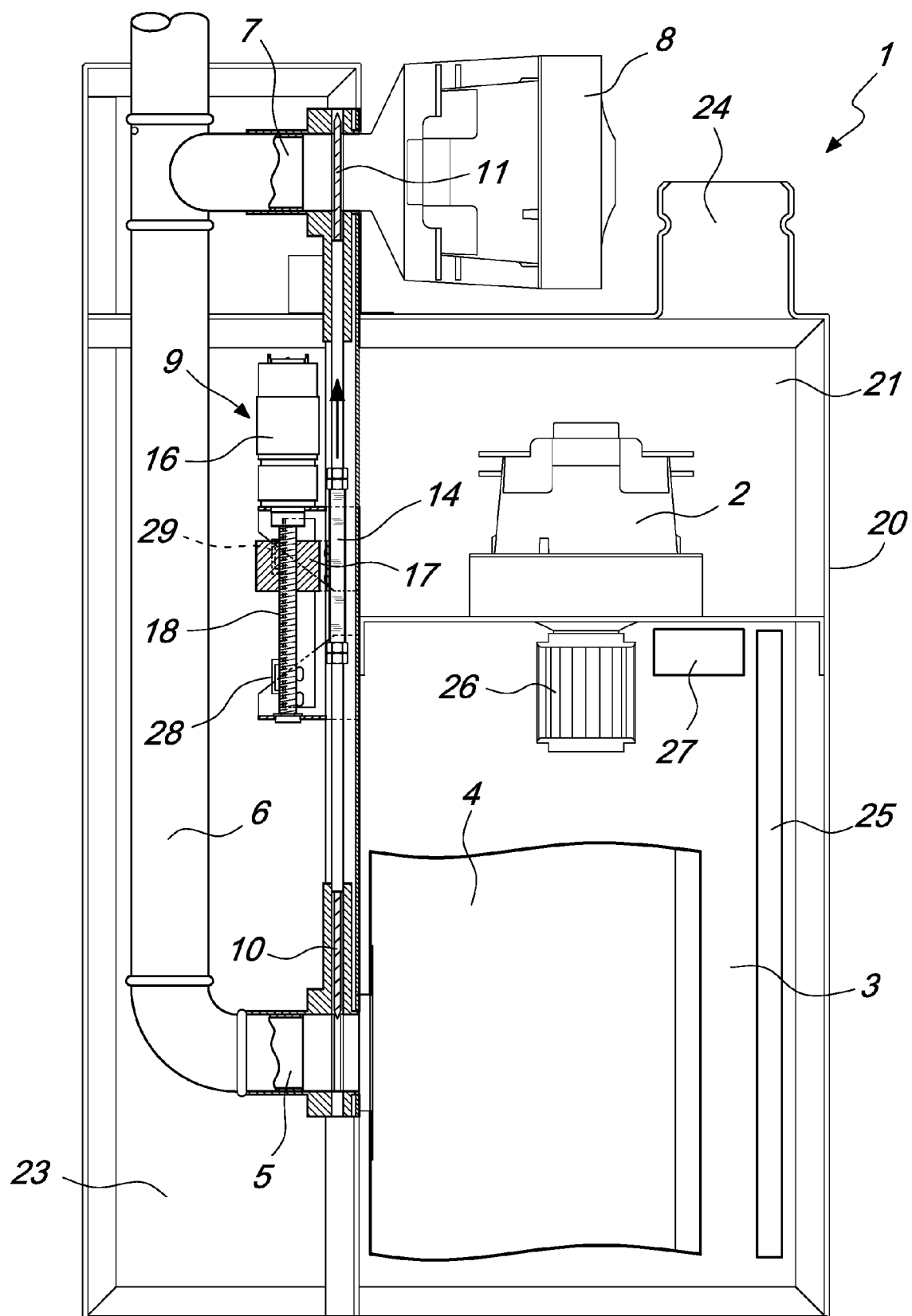


Fig. 1

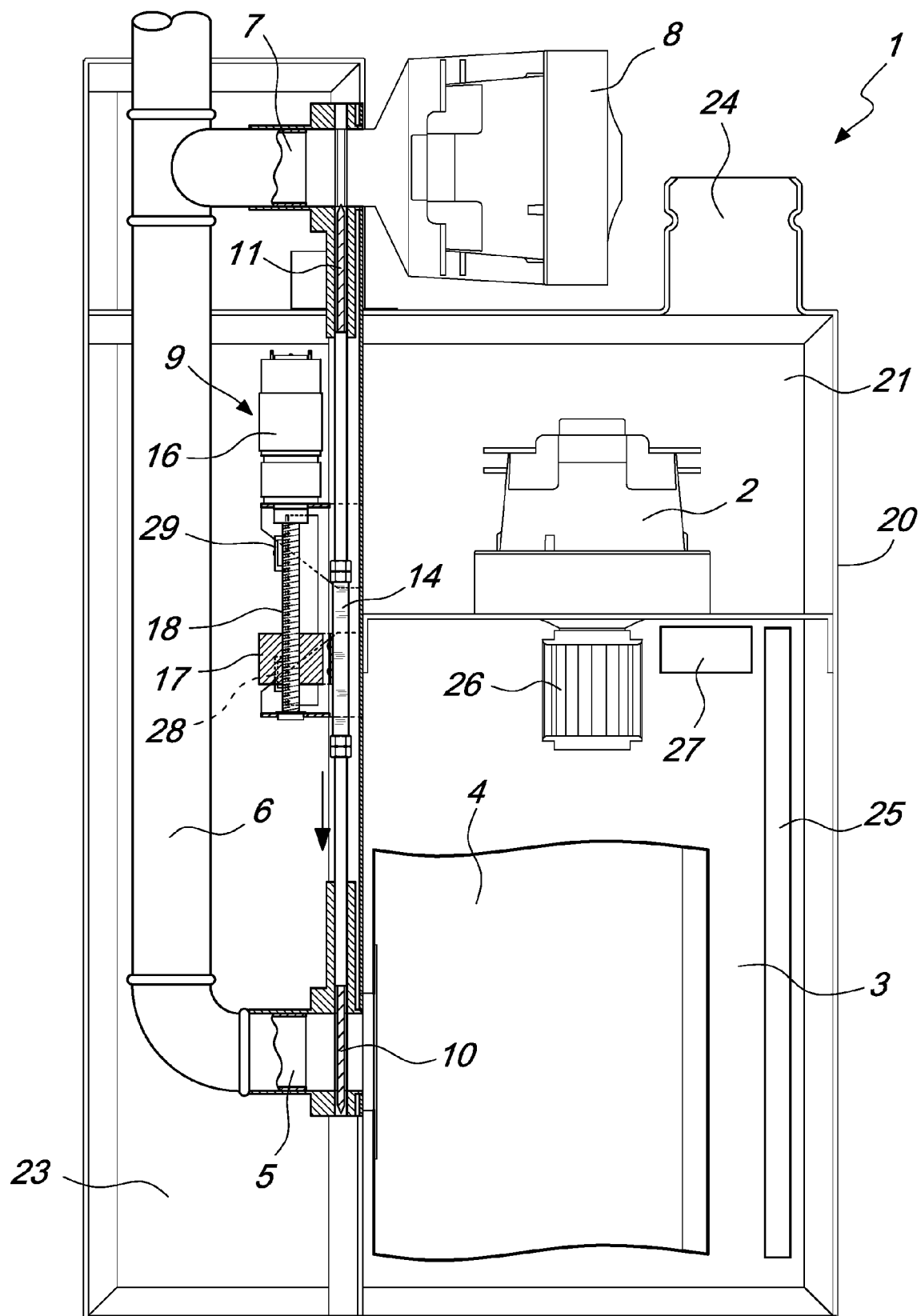


Fig. 2

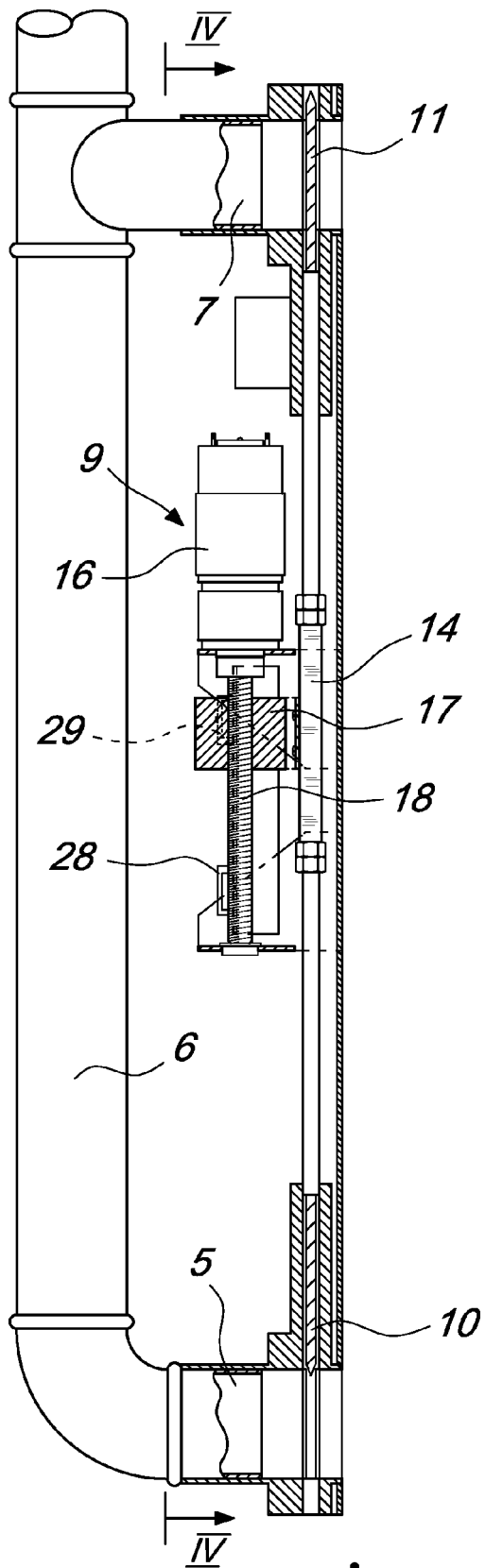


Fig. 3

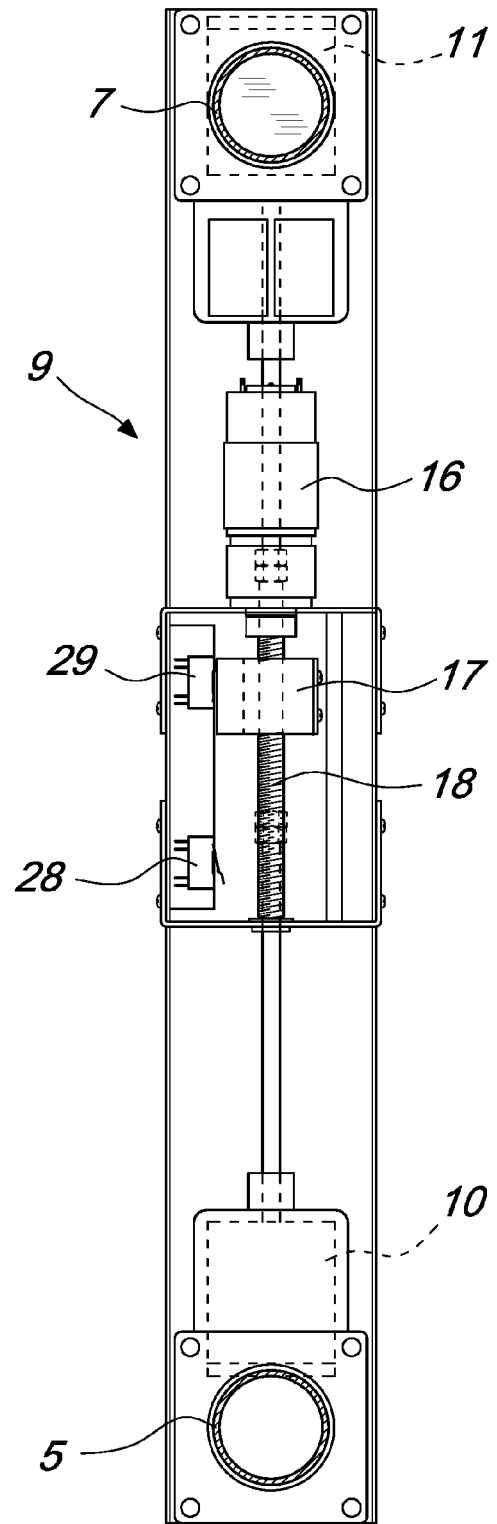


Fig. 4

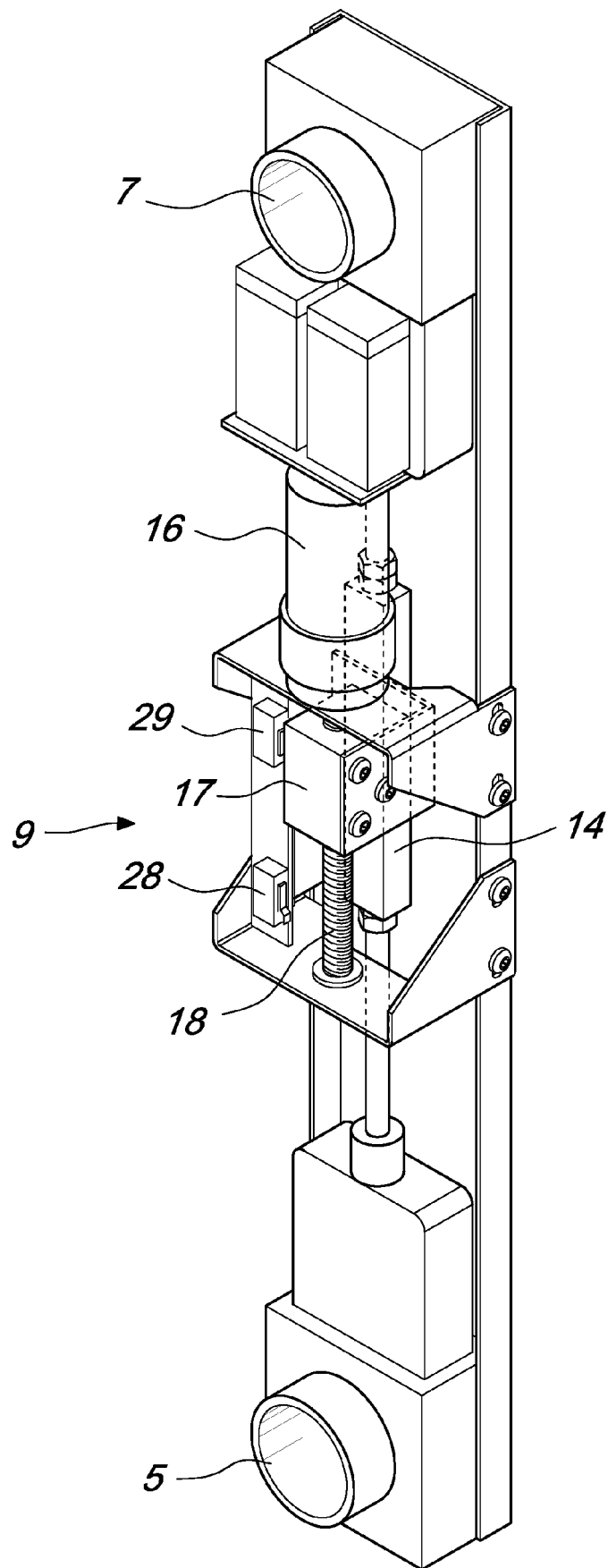


Fig. 5

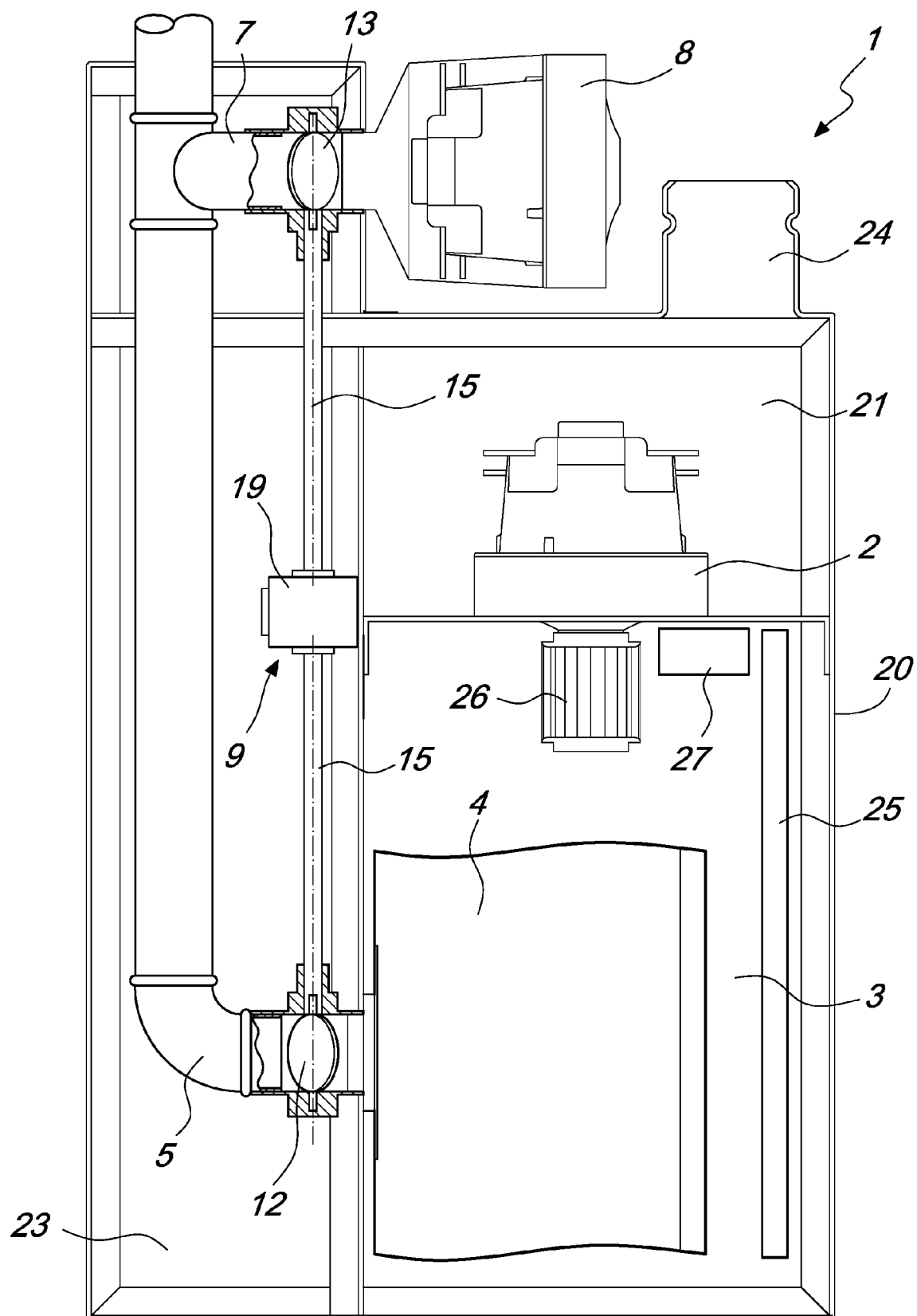


Fig. 6



EUROPEAN SEARCH REPORT

Application Number

EP 23 17 9503

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EPO FORM 1503 03.82 (P04C01)

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 3 464 859 A (HAMRICK JAMES C) 2 September 1969 (1969-09-02)	1, 3-8	INV. A47L5/14
Y	* columns 3-9; claims; figures 1,13-15 *	9,10	A47L5/38
A	-----	2	A47L7/00 A47L5/22
X	EP 0 587 384 A1 (GERBER GARMENT TECHNOLOGY INC [US]) 16 March 1994 (1994-03-16)	1, 3-8	
A	* columns 5-14; claims; figures *	2	
Y	----- JP H11 113807 A (TOSHIBA ENGINEERING CO; ES TOSHIBA ENGINEERING KK) 27 April 1999 (1999-04-27) * paragraph [0024] *	9	
Y	----- JP 2003 210362 A (SANYO ELECTRIC CO) 29 July 2003 (2003-07-29) * paragraph [0047] *	10	

			TECHNICAL FIELDS SEARCHED (IPC)
			A47L
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 16 November 2023	Examiner Lopez Vega, Javier
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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EP 23 17 9503

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16-11-2023

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 3464859 A	02-09-1969	US 3464858 A	02-09-1969
		US 3464859 A	02-09-1969
		US 3468334 A	23-09-1969
		US 3520725 A	14-07-1970
EP 0587384 A1	16-03-1994	DE 69302547 T2	02-01-1997
		EP 0587384 A1	16-03-1994
		JP H06190680 A	12-07-1994
		JP H07108519 B2	22-11-1995
		US 5361453 A	08-11-1994
JP H11113807 A	27-04-1999	NONE	
JP 2003210362 A	29-07-2003	NONE	

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Patent documents cited in the description

- IT 102022000013045 [0063]